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PAPERS

IN

MANUFACTURES.

In the 23rd Volume of the Society's Transactions, it is recorded that the SILVER MEDAL *and* FORTY GUINEAS *were that Session voted to Mr.* JOSEPH BEARD, *of Coggeshall, in Essex, for a Machine for Crooking and Cutting Wires for Cards employed in Carding Cotton and Wool. The Communications relative to this business are printed in that Volume without any Descriptive Plate, owing to the difficulty which occurred at that time of explaining the construction of the Machine by a Drawing; this difficulty has been since overcome by the exertions of Mr. Farey, Jun., and the annexed Engraving will convey a just and accurate account of this useful Machine.*

Reference

Reference to the Engraving of Mr. Beard's *Machine for Crooking and Cutting Card Wires. Plate* 2.

The machine itself is double, having parts to make two complete card wires at once; it receives two wires at once from two reels, on each of which a coil of wire is placed, the wires pass between a pair of rollers by which they are drawn into the machine, which cuts off a proper length, from the ends, and bends the pieces into the proper form, then drops them into a drawer beneath, and proceeds with two others in constant succession; our draughtsman has found it necessary, for simplicity, to exhibit only one half of the machine, which is however by itself a complete machine; and in this division some alterations were necessarily made in the form of some few of the parts, which were in the original, common to both halves. This drawing is not therefore to be considered as an exact representation of the machine in the Society's possession, though it contains all the essential parts and movements. A A, fig. 2, is the main axis, which puts all the parts in motion, it has a fly-wheel C, fixed on the end of it, and is turned round by a handle B, or it might receive its motion, from any machinery, by an endless band or strap, and pulley, as it does not require any attendance.

The wire *a a* is conducted from the reel before-mentioned, to the machine, and first passes over a rest or frame *b*, which has a notch in each of its sides, to receive the wires and to keep it down in these notches; it is also passed through a wire eye or ring *c*, to which a sufficient weight is appended to cause such a friction as will keep the wire steady.

The wire next passes through a guide formed by a hole in a piece of iron *d*, fixed by screws to a vertical standard G, rising from the iron frame F F, on which the whole mechanism is erected; by the guide *d*, it is presented to a pair of rollers or wheels D, by which it is drawn forwards; these wheels are exactly of the same size, and being beneath each other, only one can be seen in the figure; the lower roller which is hidden, is fixed upon an axis which extends across the frame, its ends being supported by the joints of the center screws 20 20, the axis is turned round by means of a teethed wheel 7 upon the main axis, acting in another exactly similar to it, fixed immediately beneath upon the axis of the lower rowler, which is perpendicular to the main axis; but the teeth of the wheels being both inclined at an angle of 45 degrees to their respective axis, become parallel at the points of contact, and the wheels turn each other round by a similar action to the endless screw; from which however this mode of communication differs most materially, in the circumstances of the two wheels or screws, (for they partake the nature of both,) being of equal dimensions and similar forms. This communication causes the lower roller to make a revolution for every one of the main axis, at the opposite end of the axis of the lower roller a cog wheel is fixed, and operates upon another, E, of exactly similar dimensions, and placed over it so as to conceal the former; this wheel is fixed upon the axis, (shown by dotted lines,) of the upper roller D, which is mounted upon the points of center screws held in a frame marked I I; this frame is attached to a standard G, of the frame F F, by two center screws, so that it will rise on the points of these as on an axis, and thus permit the upper roller to rise and fall to accommodate itself to the wire, and press it so fast upon the lower roller as to draw it forwards; the pressure is occasioned by a strong spring K fixed on the frame I, and its end hooked beneath a projecting part (not shewn) of the standard G. The rollers D, deliver the wire into a steel tube *ef*, (see also fig. 3, where it is shown separately,) the hole through which being but just large enough to admit the wire, straightens it in the manner of dies, and together with the rollers completely takes out any crooks in the wire; the tube *ef* is made in two halves, which are held together by the same clamp screw which fastens them into the bracket L supporting them. The end *f* of the steel dies, which is enlarged, as shewn in fig. 3, and has a smooth flat face, is the point where the wire is cut off by means of a small knife *g*, fixed into an axis M, on which is a lever, 5, actuated at the proper interval by the lever or claw 4, on the main axis A, into which it is screwed, and can therefore be readily adjusted in length, to operate more or less upon the lever 5, by which it cuts off the wire at the point where it emerges from the end *f* of the dies *ef*. The length of wire which is advanced through the dies before it is cut off, is measured by the end of the wire coming up to the flat head of a screw 10, supported by a bracket L, but the instant the wire reaches this, the upper roller D is lifted up so as to relieve the pressure upon the wire, this is done by a cam 1, which has a part of the frame I projecting over it, and at the end of it is a tooth or knob fastened by the square nut, this tooth is lifted up by the cam which is a circle having a deep notch cut in it, and thus relieves the wire when the circular part of the cam comes beneath it, and though the motion of the roller continues, the wire remains stationary; the notch presents itself beneath thê tooth of I; the spring K now presses the upper

Mr. Beard's Machine for cr

Fig: 1.

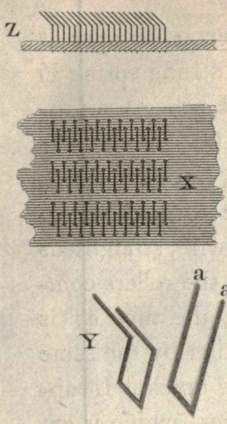
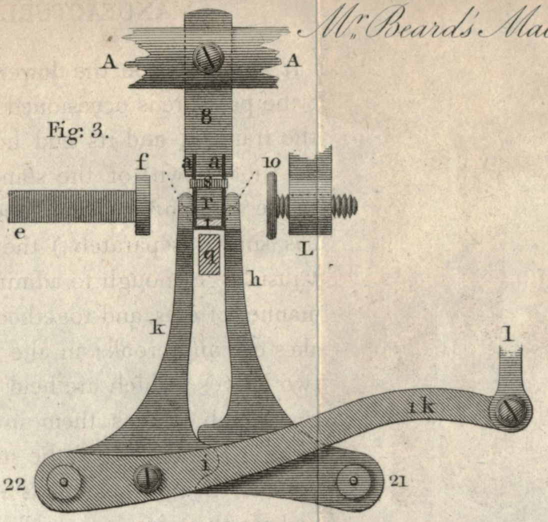
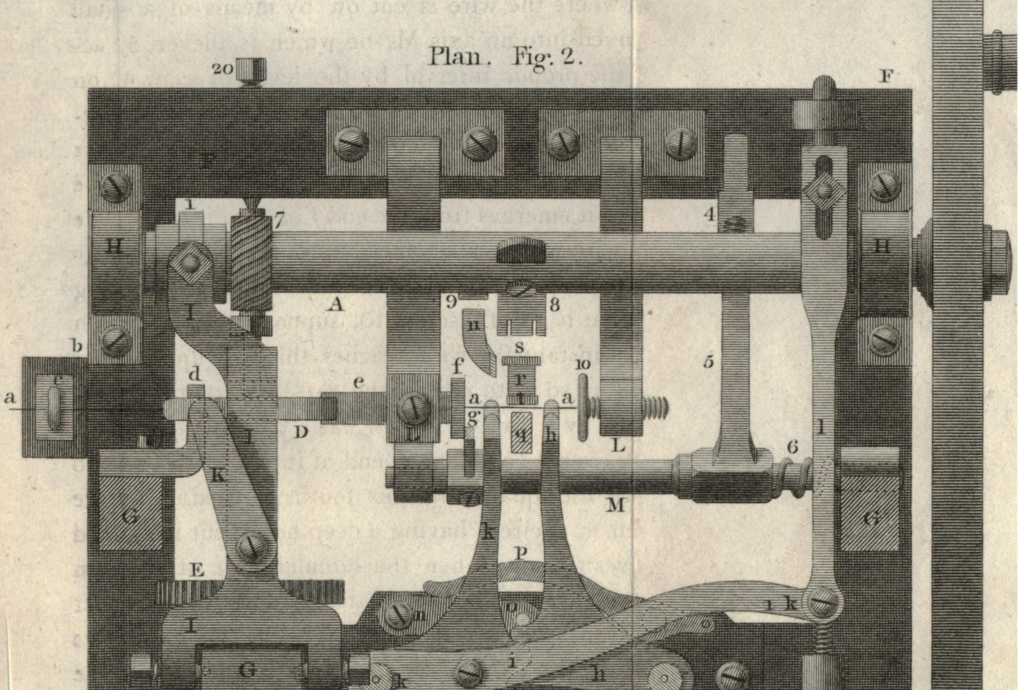


Fig: 3.

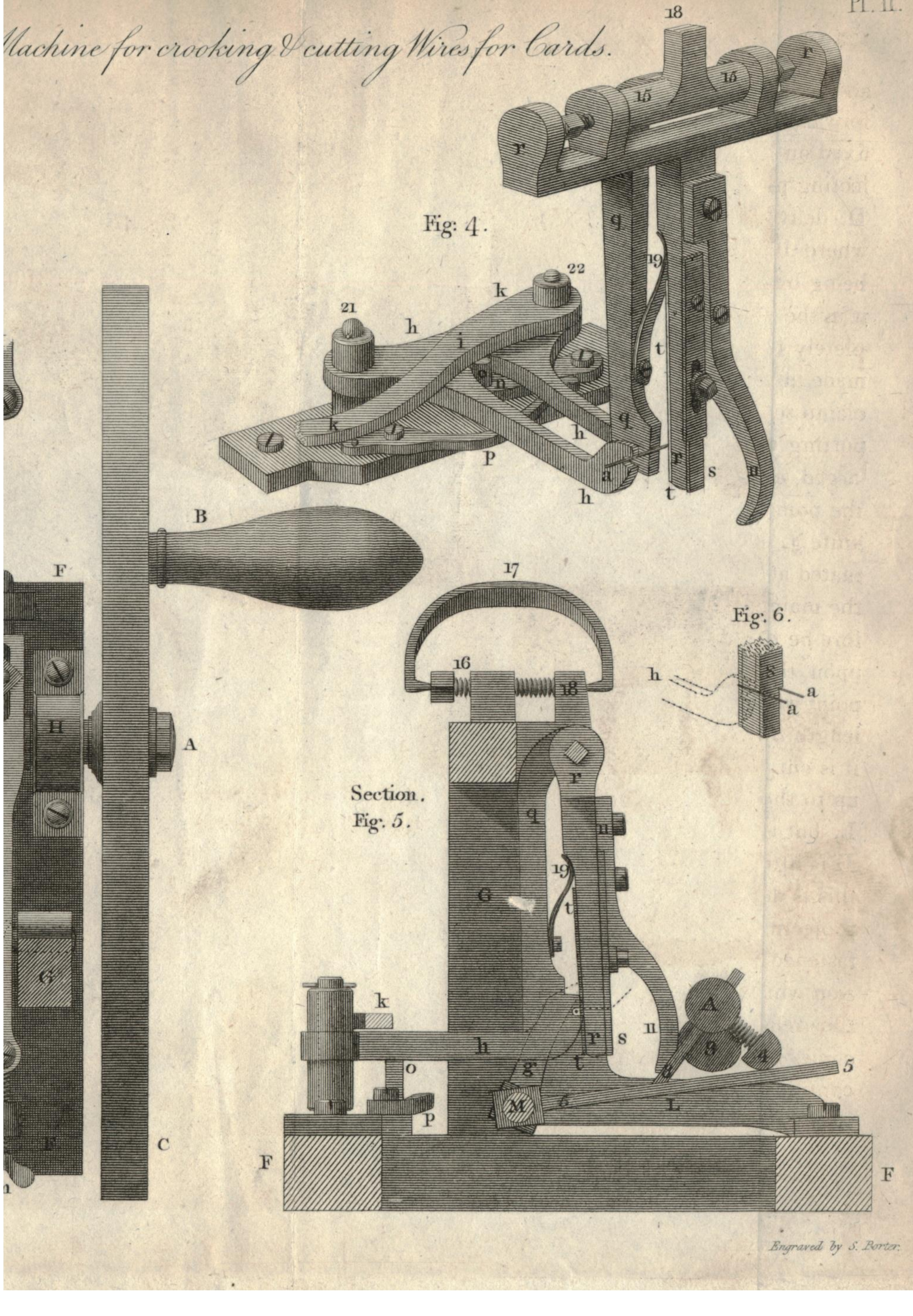


Plan. Fig: 2.



Drawn by J. Farey.

Machine for crooking & cutting Wires for Cards.



Engraved by S. Porter.

upper roller upon the wire, which is then pushed forward until the proper measure is advanced, when the upper roller will be again lifted up by the cam as before-mentioned; this movement is therefore devoted to measuring the wire, the roller and dies *e f* to straightening it, and the shears or cutter *g*, to cutting it off into the lengths measured by the screw 10. We have now to explain the mechanism for doubling and bending; these parts are in the plate shown of their real size to render them distinct, though all the other parts are only half the full size. The wire when advanced by the rollers is introduced between two pieces of metal *g* and *t r s*, these are shown in all the figures; in figs. 2 and 3 they are only represented by small squares, but figs. 4 and 5 shew them to be the ends of levers *q* and *r*, moveable on one common axis, but independently of each other; they are called the back and front blades of the plyers, their axis of motion is parallel to the main axis A, and is suspended between the points of center screws supported by the standards G G; this forms the axis of the lever *r*, as shewn in fig. 4, which only represents the moving parts; the axis of the lever *q*, marked 15 15, swings between the points of center screws attached to a part of the lever *r*, but exactly in a line with the two fixed center screws on which *r r* itself moves; thus both blades of the plyers move in the same central line, but independently, they have therefore a motion directly to and from the main axis, but no other; the two levers *q* and *r* have a small spring 19, figs. 4 and 5, between them, which always tends to separate them and open the plyers. The axis 15 of *q* has a short tail or lever, 18, rising from it, which stops against an adjusting screw 16, fig. 5, and determines the quantity of approach the end of the blade *q* (fig. 2, 3, and 5,) shall make towards the main axis; 17

is a spring of a semicircular form always drawing the tail 18 towards the screw 16, and consequently urging the blade *q* towards the main axis, the spring 19 also urges the front blade *t r s*, (fig. 2, 3, and 5,) towards the axis till the arm 11, (screwed to it,) rests upon the outside of the axis, a cam, 9, is fixed on the axis at this part, and when it comes round acts upon 11, and by it forces the blade *t r s* away from the main axis till it comes in contact with the wire *a a*, (figs. 2 and 4, and shown in fig. 5 by a small black dot surrounded by a white circle,) and presses it against the blade *q*, then holding it in the manner of a pair of plyers, or a finger and thumb, whilst the shears cut it off; all this time the blade *q* may be considered as stationary, the spring 17, fig. 5, which opposes its retreat from the main axis, being so much stronger than 19, which opens the plyers, but as the cam 9 turns farther round, it continues to press the arm 11, and the front blade with it against the wire, and by this against the other blade *q*, so as to force the plyers back all together on their common axis of motion into the position fig. 3; now the two ends of the wire being supported by the ends of two levers *h* and *k*, whilst the middle of it is thrust back by the plyers, it is doubled, or has given to it the form of a staple; the action of the levers *h* and *k*, which are called the side-benders, must be explained before this can be clearly comprehended: they have each a motion on their respective center pins or axis, 21 22, fixed in a plate screwed upon the framing F; these two levers have arms approaching each other in a direct line from one center to the other, and where they meet have a tooth *i* on the lever *k* entering a notch in *h*, and operating in the manner of a cog, to cause any angular motion, which is given to one lever to be communicated equally to the other; this causes the ends of *h* and *k* where they operate upon the wire, to mutually advance and recede from each other by equal quantities, the motion is given to the benders by a lever *k l*, which is part of *k*, but has no connection with *h*, though it passes over it; to the end of *k l*, a rod *l* is jointed which passes over the main axis, and has a stud or tooth fastened by the square nut, which is operated upon by a cam on the main axis, and at the proper interval draws *l* and *k i*, and thus opens the benders *k* and *h* in the manner shown in fig. 2, when this cam passes by the benders shut, or approach each other by the force of a spring *p*, this operates on a lever *n*, which has a pin *o* rising from it, and pressing back the tooth of the lever *h*, gives them a tendency to shut; this they do the instant the cam has relieved the lever *k l*, which retires till it rests against a screw *m*, determining the nearest distance they approach to each other as in fig. 3, and the regulation of the cam on the tooth of the rod *l* which it acts upon, (by means of its square nut,) determines the greatest openings they can have, as in fig. 2 and 4; the ends of the levers *k* and *h* where they act upon the wire have notches in them, through which the wire passes in the first instance before doubling, this is shown in figs. 2, 4, and 5; *t* and *s* are small plates of steel screwed at the two sides of the front blade *r*, of the plyers forming its faces, over these the wire is doubled by being thrust in between the side-benders, which then close together, as shewn in fig. 3 and also in fig. 7; in this state the two legs of the wire, being doubled in the form of &, fig. 1, pass just beneath two shoulders formed upon the steel blade *s*, fig. 4, in the manner explained in fig. 7; these shoulders will of course prevent the legs of the wire staple from rising, and they are bent into the shape of Y, fig. 1, by a lever 8, fixed in the main axis, which passes by at the

proper

proper time, and raises the points *a a*, figs. 3 and 7, so high as to give them the proper quantity of knee-bend, this forms the card wire, and when the cams pass by, the plyers and side-benders open into the position of fig. 2, and the card wire drops into a box beneath the machine; considering the position of fig. 3 as the point of commencement, we will recapitulate the movements of this ingenious machine to render its operation distinct, and shew the periods of the different parts of the process. On turning the main axis in such a direction that the handle B, fig. 2, descends, the cams act in the following succession.

1st. The notch of the cam 1, suffers the roller D to press upon the wire, and thus holds it fast between the upper and lower rollers, which as they turn round,—

2ndly, Advance the end of the wire *a a*, through the dies *e f*, before the notches in the ends of the side-benders *h* and *k*, and between the plyers *q*, and *t r s*, until the end of it reaches the screw 10, at this instant,—

3rdly, The cam lifts up the upper roller D, and the friction on the sides of the frame *e*, prevents its further advance, this is the state in which figs. 2, 4, and 5, represent the machines.

4thly, The cam 9 presses on the arm 11, and forces the blade *r* of the plyers back till the side *t* meets the wire, and removing it backward holds it fast against the front of the blade *q*, and pinches the wire tight between the two jaws of the plyers, whilst,

5thly, The cam 4 depresses the lever 5, and by the cutter *g* cuts off the wire instantly, leaving it held by its middle between the plyers.

6thly, The cam 9 continuing its motion, drives back both parts of the plyers together and the wire with them, its ends being supported by the ends of the side-benders, it assumes the bend of the dotted lines in fig. 2, (though the plyers are not there represented as thrown back).

7thly, A notch in the cam of the main-axis under the rod *l*, now presents itself, and suffers the spring *p*, to close the side-benders *h* and *k* together, as shewn in figs. 3 and 7, which completes the doubling of the wire, into the form of fig. 1.

8thly, The lever 8, rising, lifts the ends of the wire, and the legs being kept down by the shoulders of *s*, gives them the knee bend; the manner of this is shewn by the dotted lines in fig. 5, though neither the plyers or lever 8 are there in the proper situation to effect this part of the process.

9thly, All the cams, except 1, cease their respective actions at once, and the finished wire drops out of the plyers; thus the cam 4 has, in the interim of the other operation, passed by, and suffered the blade *g*, of the plyers, to return by the action of its spiral spring 6; the cam of the rod *l*, and lever *k* 1, opens the side-benders; the cam 9 passes by, and permits the return of the plyers by the spring 17, fig. 5; but when the tail, 18, of the blade *q*, meets its stop screw 16, *q* returns no farther; but the front blade *r*, continues to advance towards the axis, by its spring 19, as fast as the cam 9 suffers it; this opens the plyers, and the wire falls out. The notch of the cam 1, now comes round, and suffers the roller D to descend on the wire, and advance another portion, which is treated in the same manner as the first.

These operations succeed each other with such rapidity when the machine is in action, that the handle may be turned at the rate of 150 turns per minute, without in the least injuring its operation; and the power required to

turn

turn it is so small, that one person might turn a dozen; or, if they were turned by a mill, he could attend a greater number, as they very seldom act wrong, or make a false wire.

The machine is capable of making wires of any size, by means of the following adjustments:

1st. The length of the notch in the cam 1, regulates the length of the wire which shall be cut off, because it is only as long as this notch is presented to the lifting tooth of the frame I, that the rollers act upon the wire; the screw 10 is adjusted to stop the wire when sufficiently advanced: but this is only a precaution to prevent any accidental protrusion after the cam 1 has lifted the roller. The cam 1, as before stated, is a circle; and, to have the means of adjusting the length of the notch in it, the cam is made of two equal circles, or wheels, fitted on the main axis, and applied to each other side by side, so as to make one; the beak of the frame I, which rests upon their circumference, is as broad as both circles together; each has a notch cut in it, much wider than the notch in the cam is ever intended to be.

Now, if these circles were twisted round on the axis, so as the notch in one circle was applied opposite to the complete part of the other, the cam would act as a complete circle, and the tooth of I, would never drop in the notch of either, because the circumference of the other circle holds it up at the time; on the other hand, by placing the two notches opposite to each other, the rollers would be suffered to act upon the wire longer than is ever intended; therefore, between these two extremes, the limits of the notch may always be determined by trial, that the proper length of wire shall be protruded; one circle making the beginning, and the other the end of the notch in the cam; both are fastened on the axis by clamp screws.

2nd. The centre screws, on which the whole of the plyers *r*, *r*, fig. 4, are suspended, admit of adjusting them, that their blades shall seize the wire by the middle, and make the ends of the staple equal when doubled.

3rd. The steel faces *t* and *s*, of the blade *r*, of the plyers, can be removed, and any other substituted; this regulates the distances between the legs and parts of the card wire, or the length of its shank.

4th. The screw *m* determines the degree of closure the side-benders shall have, and the square nut on the rod *l*, (which attaches to it the piece on which the cam operates,) determines the distance to which they will open; this is of consequence, for the wire, if bent too suddenly at once, into the dotted position, fig. 2, might be cut or broken, instead of being bent fairly.

5th. The screw which fixes the lever 8 into the main axis, admits the lever to be set further out, and then it will give a greater degree of knee bend; or, if nearer to the axis, will bend less, this is also influenced by the quantity of motion the cam *g* gives to the plyers, which can be adjusted, by sliding the curved arm 11, up or down the lever *r*, for which purpose its screws are fitted in grooves; this causes a more or less protuberant part of the curve 11, to meet the cam 9; the screw 16, as before stated, adjusts the blade *g* of the plyers.

The **GOLD MEDAL**, *the Premium offered in Class 137, was this Session adjudged to* **EDWARD SHEPPARD**, *Esq. of Uley, in Gloucestershire, for producing, from his Flocks of* 1929 *Merino and Merino-Ryeland Sheep, in the year* 1811, 7749 *lbs. of Wool. The following Communications on the subject were received from him, and Samples of the Wool are preserved in the Society's Repository.*

SIR,

I SEND you, for inspection of the Society of Arts, &c. an account of the produce of 1929 Merino, and Merino-Ryeland sheep, the whole *bred* and kept by me, and shorn in the year 1811, and sold by me at the under prices, with specimens of the R, or *Rafinos*, wool, in its unwashed and washed state, of the yarn spun from the same, and of a superfine black cloth, and white milled kerseymere, manufactured wholly from that wool; the flocks kept in part at Uley, and part at Oxenton, in Gloucestershire.

Produce of 890 sheep, in the grease, not washed on the sheeps' back, sorted as under:—

(Uley Farm.)

In the Grease.

1892,	1st R, (or Rafinos.)
424,	2nd R.
828,	F, (or Finos.)
401,	T, (or Terceros.)
120,	K, (or Kaibos.)
3665,	being 4 lbs. 1 oz. per fleece.

Produce of 1039 sheep, *washed on the sheeps' back*, sorted as under:—

(Oxenton Farm.)

154,	from fat wethers, not sorted.
2095,	1st R.
843,	2nd R.
378,	F.
270,	T.
188,	K.
54,	List.
84,	Beltings.
18,	Russett.
4084,	being 4 lbs. wanting 1 oz. per fleece.

It will be noticed, that there is very little difference in the weight of the fleeces, whether washed on the sheeps' back, or not; but it is to be observed, that the Uley flock, (of which the wool was in the grease,) consisted *wholly* of ewes, which produce smaller fleeces than the wethers, on the Oxenton farm. The wool of the ewe fleeces was considerably finer than that of the wethers.

I sold the above wool for 1552 *l.* 1 *s.*, as under:—

	£.	s.
3665 lbs. of wool, in the grease, at 4 *s.*	733	0
3930 lbs. of wool, washed on the sheeps' back, at 4 *s.* - - - -	819	1
	£. 1552	1

EDWARD SHEPPARD.

Uley, Gloucestershire, March 5, 1812.

I take the liberty of annexing a few remarks on the subject of British Merino wools. I also enclose the necessary certificates, with a view to substantiate my claim, for the largest quantity and value of Merino wool, grown, sold, and manufactured, in the year 1811.

To C. Taylor, M.D. Sec.

Thoughts on the best state in which to produce the British Merino Wools for the Market.

Having had the experience of more than ten years, both in the growth and manufacture of British Merino wools, which, by the constant use of the Spanish rams that came into his Majesty's possession during that period, I have brought to very great perfection; I take this method of making public the result of my observations, as to the mode most profitable for the grower and manufacturer, to prepare the Merino wools for the market; as considerable difference of opinion and practice prevail on the subject.

I had the honor, in the year 1806, to present a memoir to the Board of Agriculture, in a successful claim I made, for the Gold Medal given for the greatest quantity of fine wool, grown within the year. I therein stated my opinion, that the principal cause of the superior and characteristic softness of the Saxon and Anglo-Merino wools, was, their remaining in their native grease, without its being expunged in the extreme degree practised in Spain. Excepting the moderate washing that Saxon and British wools receive on the sheeps' back before shearing, they continue in their grease till they are worked up by the manufacturer; while the wools in Spain, as soon as shorn, are thoroughly scowered, by an injudicious process, and then exposed for days to a burning sun, in which brittle and hard state they are so closely packed up, that they come out of their bags here, almost as much pressed and hard as hops, wholly deprived of that unctuous preservative, which I conceive to be necessary to the soft feel of wool.

It has been thought by some, that Saxon and Anglo-Merino wools, have a softness peculiar to themselves, and different from the Spanish, their parent stock, obtained from their cross with another and coarser woolled sheep. I am, however, very much disposed to attribute the quality here spoken of, to the better management of the wools in this country. Unfortunately, we have no opportunities of discovering what Spanish wool would be preserved in the grease; as the mode of laying on the duties at Burgos, by the pound, prevents the grower or merchant exporting it in that condition. Otherwise, I am much inclined to think the same softness would be found in the pure parent fleece, as in the spurious offspring. From the small experience afforded by the ill-conditioned fleeces lately imported with the sheep from Spain, I am very much confirmed in my opinion.

Lambs' wool, not being so completely washed from its grease in Spain, as sheeps' wool, comes very near to the softness of the Saxon and British lambs' wool. As a proof of their possessing an extra quantity of grease, they are much sooner liable to breed the worm than Spanish sheeps' wool. I have often proved, in the manufacture of wool, that where it has been long saturated with oil, artificially, the fibre has been lubricated by it, and the cloth very superior in feel and softness.

It has long been known to manufacturers and wool-staplers, that the wool of dead sheep, or Vell-wool, as it is called, is very harsh, and quite unlike the same wool shorn from the sheeps' back, occasioned by its being disengaged from the skin, by the fell-monger, by the action of lime, which entirely dries up and destroys the oily particles. May it not, in some measure, arise from the cause, that wool from sheep used to calcareous or silicious soils, is of a harsher description; as those from the Sussex, or Wiltshire downs, when compared with the fleeces grown on the argillaceous lands of Hereford and Shropshire? The absorption of the native grease, by the frequent contact of the sheeps' coat with the soil, and the dust from it, may help to remove that great preservative of softness, and leave the fibre exposed, unprotected by moisture, to the action both of the sun and rain, which, in those exposed situations, would act with double power.

From the above theory I would wish to deduce a few inferences, which may be of service in the growth and management of British fine wools. In the first place, I am satisfied that nothing can so much tend to preserve this necessary state of native grease, as the protecting the fleece from the humidity and inclemencies of climate. In a country where such exist in any great degree, it would be requisite, in *order to attain and preserve a superior degree of fineness,* that the sheep be housed in the winter, as practised in Saxony, and the northern parts of Germany, where they not only cot them in the winter, but drive them under cover at every thunder-storm in summer. The frequent washing of a sheep's coat, will very much deprive it of its grease, as is evident from comparing the external part of the fleece with the internal. The same comparison will show how greatly such washing has impaired its fineness. The closeness of the coat of the *Spanish sheep,* compacted as it is, by its vast diffusion of grease, into almost a coat of mail, prevents the admission of the rain infinitely beyond that of any other sheep we know of; and accordingly protects the quality of the wool longer from deterioration. But even the Spanish fleece, by constant exposure to a humid climate, and to driving winds, and rains, will be penetrated, and every year become more open and hollow, and less tenacious of its native grease, and, in proportion, less fine.

My opinion, as to the best mode of preparing Merino wool for the market, is, that where a certain and ready sale offers, it should be left wholly in its native grease, without being washed on the sheeps' back. This further advantage attends it, that the fleece is much more captivating to the eye, and the fibre appears much more silky and fine. I fear, however, that there is not, at present, that quickness and certainty of sale, which will permit the grower to produce his wool in this condition. For if they have a chance of lying a long time in the grease, they will heat and be injured. I cannot therefore recommend it as a general practice, but I think where wools are likely to be used within six months of shearing, there can be no objection to keeping them in the full grease. I have, however, the satisfaction to state, that by the moderate degree of ablution, which takes place in washing the wool on the sheeps' back, the grease is not expunged in a degree to injure the softness of the fibre. The same mode is practised in Saxony, and is altogether different from the complete washing in hot and cold water, which the wool receives after being shorn in Spain.

The waste on British Merino wool, which has never *been washed on the sheeps' back*, is rather more than one half, or about 10 lbs. in 20, reckoning to its clean picked state. The same wool, *when washed on the sheeps' back*, loses with the manufacturer about one-third, or from 6 to 7 lbs. in 20, which is about the average of the waste of Saxon wool. Whereas, the best imported Spanish wools will not waste more than half that amount: viz. from 3 to 4 lbs. in 20. It is obvious, that a proportionate difference must be made in price, for the different conditions in which British Merino wools are produced; the manufacturer will be better able to estimate the probable waste of the wool that has been washed on the sheeps' back, as there is so much dirt, sand, and filth, generally with the wool in its genuine, unwashed state, that the waste must be always uncertain. I think, therefore, that wools washed on the sheeps' back will be the most merchantable.

I would also remark on the most preferable mode of managing the lambs' fleece, which I should recommend cutting, in preference to remaining on the lamb, till he becomes a yearling, as practised by many. The external part of the hog's fleece, which was the original lambs-wool, suffers most materially from the inclemency of the weather and the winter. In its state of lambs-wool it is beautifully soft, but being afterwards protruded from the new coat, it is in that condition exposed to the snows, winds, and rains of the winter, by which it becomes entirely deprived of its grease, and as coarse as the wool of our common country sheep. The deterioration of this exposed part of the fleece, in one season only, fully proves what effect climate and weather have on the fibre of wool; it is therefore certainly desirable to shear the lambs, as in Spain; and although the covering may be more complete for the young sheep against the winter with the lambs coat on, yet the being rid of the incumbrance of a wet draggled fleece, in deep soils and bad weather, is of great advantage to the young and tender sheep.

EDWARD SHEPPARD.

Uley, Gloucestershire, March 5, 1812.

CERTIFICATES.

I DO hereby certify, that the Merino wool, bought of Edward Sheppard, Esq. by the house of Messrs. Sheppard, and Co. in the year 1811, was sorted, and produced as under; and that the same was worked up into superfine cloths and kerseymeres; and that the specimen marked 114,133, Imperial British, was taken from a cloth made from the R's of the said wool; and the specimen marked 114,660, from a kerseymere made from the same.

Wool in the Grease.

1892,	1st R.
424,	2nd R.
828,	F.
401,	T.
120,	K.
3665	

Wool washed on the Sheeps' back.

2095, 1st R.
843, 2nd R.
378, F.
270, T.
188, K.
54, List.
84, Beltings.
18, Russett.

3930
154 in the grease, from fat wethers.

SAMUEL ROWLES,

Foreman to Messrs. Sheppard and Co.

March 7, 1812.

I DO hereby certify, that Messrs. Sheppard and Co. bought of Edward Sheppard, Esq. of Uley, in the year 1811, the under wools, at the prices stated:—

August 1st, 1811.

			£.	s.
3665 lbs.	Merino wool,	in grease, at 4 *s.*	733	0
154	do.	do. do. 3 *s.*	33	1
3930	do.	washed before, 4 *s.*	786	0
		£.	1552	1

For Sheppard and Co.

ROBERT TOMKINS.

Uley, March 6, 1812.

I do hereby certify, that the flock of Edward Sheppard, Esq. of Uley, Gloucestershire, in the year 1811, consisted of 1929 Merino and Merino-Ryeland sheep, bred by himself; of which 890 were kept on his farm at Uley, and 1039, at Oxenton, Gloucestershire; and that 3665 lbs. of wool, in the grease, were shorn from the former; and 4084 lbs. of wool, washed on the sheeps' backs, from the latter, excepting 154 lbs. which were cut from fat wethers.

William Crouch,
Bailiff to Mr. Sheppard.

March 6, 1812.

The Gold Medal *or* Forty Guineas, *at the Option of the Candidate, the Premium offered in Class* 146, *for the manufacture of Sail-Cloth proper for the use of the Royal Navy, and equal to the best Dutch, was this Session adjudged to Messrs.* Robert *and* Giles Cayme, *of Yeovil, in Somersetshire, who handsomely preferred the honorary Reward. The following Communication was received from them, and a whole Piece of the Sail Cloth placed in the Society's Repository. The Piece for which the*

the Premium was adjudged, is one of those called Double Canvas, $24\frac{1}{2}$ inches wide, and 40 yards long.

SIR,

WE have this day sent you three pieces of sail cloth, of our manufacture, to be presented to the Society of Arts, &c. for their inspection, which we hope will be approved of. We have annexed the process of the different stages of their manufacture.

We remain,
Sir,
Your obedient humble servants,
ROBERT & GILES CAYME.

Yeovil, March 12, 1812.

To C. TAYLOR, M. D. SEC.

Process for manufacturing Sail Cloth.

THE two pieces of double canvas sent, were made of long flax, the warp of English, the weft of foreign growth, the spinning performed by hand, and grass bleached, in which process one-half of wood ashes, and one-half of pearl ashes, were used, except in the last bucking, when all pearl ash was employed; the warp of the heaviest piece weighed thirty pounds, the weft twenty-one and a half; the warp of the other weighed twenty-eight pounds, the weft about twenty-three.

The piece thirty inches wide is made similar to the Dutch canvas, the warp of long flax, the weft of tow, spun by the hand, and bleached in the same manner as the former; the weight of the warp was twenty-two pounds, of the weft thirty-one and a half.

The two double pieces were wove by George Cooper, of East Chinnoch, Somerset, and are 24½ inches wide, and forty yards long; the thirty inch piece was wove by Charles Foot, of the same place.

CERTIFICATES.

A CERTIFICATE was received from Mr. WILLIAM CAYME, of Yeovil, testifying, that the two pieces of sail cloth, sent to the Society of Arts, &c. were manufactured by Messrs. Robert and Giles Cayme; that he had examined them, and found them equal, in quality, to the best Dutch.

A CERTIFICATE was produced from Mr. JOHN COWPLAND, Sail Maker, Successor to the late Mr. Robert Jenkins, St. Catherine's-square, London, testifying, that he had examined the two whole pieces of canvas, called heavy double, manufactured by Messrs. Robert and Giles Cayme, of Yeovil, and that in his opinion they were, both in manufacture and materials, of the best quality that can be produced; and that he has had an experience of upwards of twenty-five years in the business, and is Sail-Maker to the Honorable the Board of Customs.

That he has had the trial of Dutch canvas to a great extent, but that the pieces produced by Messrs. Caymes, are likely to be more durable and serviceable for wear, and are superior to any Dutch canvas he ever saw.

The Premium for making, in Great Britain, sail cloth equal to the Dutch, was first offered by the Society at the suggestion of the Earl of Dundonald, who, in the year 1806, proved to the office of Naval Revision, the defects of the sail cloth generally used in the Royal Navy. The Society of Arts, &c. in order to form a proper and accurate judgment of the subject, were favored, by directions of the Lords of the Admiralty, with many specimens of sail cloth from the Navy-Office, of the sorts generally used in the Royal Navy. The Society also procured specimens of the best Dutch sail cloth, from different places, and subjected the whole to a fair comparison with the sail cloth manufactured by Messrs. Caymes. The result of this examination was, in the opinion of Mr. Richardson, Mr. Hossack, and Mr. Cowpland, who are all conversant in this branch of business, that the canvas or sail-cloth made on this principle by Messrs. Caymes, is superior to the Dutch; that it is now advantageously employed for the Custom-House cutters, and greatly approved of; and that it is fit for every naval purpose where security is an object; that though it is higher in price in the first purchase, yet from its strength, durability, and not being liable to mildew, it is far preferable to any that is commonly used in the Royal Navy.

Specimens of the article rewarded have since been presented, by the Society, to the Admiralty and Navy Offices.